AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

- 1. (Currently Amended) A polypeptide having a binding affinity for HER2, wherein the sequence of the polypeptide comprises the sequence of a protein Z, as set forth in SEQ ID NO:1, having from ± 4 to about 20 substitution mutations thereon, comprising at least four substitution mutations at the positions 13, 14, 28, 32 and 35.
- 2. (Previously Presented) A polypeptide according to claim 1, which has a binding affinity for HER2 such that the K_D value of the interaction is at most 1 x $10^{-6}\ M_{\odot}$
- 3. (Previously Presented) A polypeptide according to claim 2, which has a binding affinity for HER2 such that the K_D value of the interaction is at most 1 x 10^{-7} M.
 - 4. (Canceled).
 - 5. (Cancelled).

- 6. (Cancelled).
- 7. (Currently Amended) A polypeptide according to claim $\frac{6}{1}$, additionally comprising substitution mutations at one or more of the positions 9, 10, 11, 17, 18, 24, 25 and 27.
- 8. (Previously Presented) A polypeptide according to claim
 1, comprising a substitution mutation at position 13 from
 phenylalanine to tyrosine.
- 9. (Previously Presented) A polypeptide according to claim
 1, comprising a substitution mutation at position 14 from
 tyrosine to tryptophan.
- 10. (Previously Presented) A polypeptide according to claim
 1, comprising a substitution mutation at position 28 from
 asparagine to an amino acid residue selected from arginine and
 histidine.
- 11. (Previously Presented) A polypeptide according to claim
 1, comprising a substitution mutation at position 28 from
 asparagine to arginine.

- 12. (Previously Presented) A polypeptide according to claim
 1, comprising a substitution mutation at position 32 from
 glutamine to arginine.
- 13. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 35 from lysine to tyrosine.
- 14. (Previously Presented) A polypeptide according to claim 1, comprising a substitution mutation at position 10 from glutamine to arginine.
- 15. (Previously Presented) A polypeptide according to claim
 1, comprising a substitution mutation at position 11 from
 asparagine to threonine.
- 16. (Previously Presented) A polypeptide according to claim
 1, comprising a substitution mutation at position 17 from
 leucine to valine.
- 17. (Previously Presented) A polypeptide according to claim
 1, comprising a substitution mutation at position 27 from

arginine to an amino acid residue selected from lysine and serine.

- 18. (Previously Presented) A polypeptide according to claim 1, comprising at least the following mutations: F13Y, Y14W, N28R, Q32R and K35Y.
- 19. (Previously Presented) A polypeptide according to claim 1, the amino acid sequence of which is selected from the group consisting of SEQ ID NO:2-79.
- 20. (Previously Presented) A polypeptide according to claim 19, the amino acid sequence of which is selected from the group consisting of SEQ ID NO:2-3.
- 21. (Previously Presented) A polypeptide according to claim
 1, in which at least one of the asparagine residues present in
 the protein Z has been replaced with another amino acid residue.
- 22. (Previously Presented) A polypeptide according to claim 21, comprising substitution mutations at at least one position chosen from N3, N6, N11, N21, N23, N28, N43 and N52.

- 23. (Previously Presented) A polypeptide according to claim 22, comprising at least one of the following mutations: N3A, N6A, N6D, N11S, N23T, N28A and N43E.
- 24. (Previously Presented) A polypeptide, which constitutes a fragment of a polypeptide according to claim 1, which fragment retains binding affinity for HER2.
- 25. (Previously Presented) A polypeptide according to claim 1, which comprises additional amino acid residues at either terminal.
- 26. (Previously Presented) A polypeptide according to claim 25, in which the additional amino acid residues comprise a cysteine residue at the N- or C-terminal of the polypeptide.
- 27. (Previously Presented) A polypeptide according to claim 25, in which the additional amino acid residues comprise a tag, preferably chosen from a hexahistidinyl tag, a myc tag and a flag tag.
- 28. (Currently Amended) A polypeptide according to claim 25, in which the additional amino acid residues comprise at least

one functional polypeptide domain, so that the polypeptide is a fusion polypeptide between a first moiety, consisting of a polypeptide having a binding affinity for HER2, wherein the sequence of the polypeptide comprises the sequence of a protein Z, as set forth in SEQ ID NO:1, having from ± 4 to about 20 substitution mutations thereon and comprising at least four substitution mutations at the positions 13, 14, 28, 32 and 35, and at least one further moiety.

- 29. (Currently Amended) A polypeptide according to claim 28, in which the further moiety consists of one or more polypeptide(s) having a binding affinity for HER2, wherein the sequence of the polypeptide comprises the sequence of a protein Z, as set forth in SEQ ID NO:1, having from $\frac{1}{4}$ to about 20 substitution mutations thereon and comprising at least four substitution mutations at the positions 13, 14, 28, 32, and 35, making the polypeptide a multimer of HER2 binding polypeptides, the sequences of which may be the same or different.
- 30. (Previously Presented) A polypeptide according to claim 28, in which the further moiety comprises at least one polypeptide domain capable of binding to a target molecule other than HER2.

- 31. (Previously Presented) A polypeptide according to claim 30, in which the further moiety comprises at least one polypeptide domain capable of binding to human serum albumin.
- 32. (Previously Presented) A polypeptide according to claim 31, in which the at least one polypeptide domain capable of binding to human serum albumin is the albumin binding domain of streptococcal protein G.
- 33. (Previously Presented) A polypeptide according claim 30, in which the further moiety comprises a polypeptide wherein the sequence of the polypeptide comprises the sequence of a protein Z, as set forth in SEQ ID NO:1 having from 1 to about 20 substitution mutations.
 - 34. (Cancelled).
- 35. (Previously Presented) A polypeptide according to claim 28, in which the further moiety is capable of enzymatic action.

- 36. (Previously Presented) A polypeptide according to claim 28, in which the further moiety is capable of fluorescent action.
- 37. (Previously Presented) A polypeptide according to claim 28, in which the further moiety is a phage coat protein.
- 38. (Previously Presented) A polypeptide according to claim 1, which further comprises a label group.
- 39. (Previously Presented) A polypeptide according to claim 38, in which the label group is selected from the group consisting of fluorescent labels, biotin and radioactive labels.
- 40. (Previously Presented) A polypeptide according to claim 1, coupled to a substance having an activity against cells overexpressing HER2.
- 41. (Previously Presented) A polypeptide according to claim 40, in which said substance having an activity against cells overexpressing HER2 is selected from the group consisting of cytotoxic agents, radioactive agents, enzymes for antibody-

directed enzyme prodrug therapy applications (ADEPT), cytokines and procoagulant factors.

- 42. (Cancelled).
- 43. (Cancelled).
- 44. (Cancelled).
- 45. (Cancelled).
- 46. (Cancelled).
- 47. (Previously Presented) A method of treatment of at least one form of cancer characterized by overexpression of HER2, which method comprises administering to a subject in need of such treatment a therapeutically effective amount of a composition, which comprises a polypeptide according to claim 1 as an active substance.
 - 48. (Canceled).

- 49. (Previously Presented) A method of directing a substance having an anti-cancer activity to cells overexpressing HER2 in vivo, which method comprises administering a conjugate of said substance and a polypeptide according to claim 1 to a subject.
 - 50. (Canceled).
 - 51. (Canceled).
- 52. (Previously Presented) A method of detection of HER2 in a sample, comprising the steps: (i) providing a sample to be tested, (ii) applying a polypeptide according to claim 1 to the sample under conditions such that binding of the polypeptide to any HER2 present in the sample is enabled, (iii) removing non-bound polypeptide, and (iv) detecting bound polypeptide.
- 53. (Previously Presented) A method according to claim 52, in which the sample is a biological fluid sample, preferably a human blood plasma sample.
- 54. (Previously Presented) A method according to claim 52, in which the sample is a tissue sample.

- 55. (Cancelled).
- 56. (Previously Presented) A kit for in vivo diagnosis of HER2 overexpression, which kit comprises a polypeptide according to claim 1 labeled with a chelator, a diagnostic radioactive isotope, and reagents for the analysis of the incorporation efficiency.
 - 57. (Cancelled).
- 58. (Previously Presented) The method according to claim 54, wherein the sample is a human tissue sample.
- 59. (Previously Presented) The method according to claim 54, wherein the sample is a biopsy sample from a human suffering from cancer.